State of Idaho
DEPARTMENT OF WATER RESOURCES
322 East Front Street • P.O. Box 83720 • Boise, Idaho 83720-0098
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C. L. "BUTCH" OTTER
Governor

DAVID R. TUTHILL, JR.
Director

November 27, 2007

Ms. Debbie Suehr
Bureau of Reclamation
1150 N. Curtis Road
Boise, ID 83706

RE: Request under Freedom of Information Act

Dear Debbie:

The Idaho Department of Water Resources requests copies of the following information under the Freedom of Information Act (FOIA):

Minidoka Project, ID-WY, North Side Pumping Division – DPR appendix

- *Project Lands* (June 1952; rev. July 1956) no.1
- *Supplement to Project Lands* (1956)
- *Water Supply Supplemental (1954);* no. 1
- *Supplemental Drainage (1954);* no. 1

Minidoka Project, ID-WY, North Side Pumping Division, *Definite Plan Report, Volume 1, General Plan, February 1955,* Region 1

- Three revision sheets inside

Minidoka Project, ID-WY, North Side Pumping Extension – PFWD appendix

- *Drainage Investigations, Supporting Computations* (December 1974)

Minidoka Project, ID-WY, North Side Pumping Division Extension – Planning Report/Draft EIS

- *Hydrology* (July 1985); no. 1 [include large drawings/maps full size]

Minidoka Project, ID-WY, North Side Pumping Division, *Drainwater Management Plan, Draft Environmental Assessment,* December 1993, PN Region

Minidoka Project, ID, WY, North Side, *Minidoka North Side Resource Management Plan,* January 2005, SRAO (CD version)

If you have any questions, please call me at (208) 287-4841.

5 fillings

45

NIDOKA PROJECT

I SIDE PUMPING DIVISION

IDAHO

DEFINITE PLAN REPORT

VOLUME 1 GENERAL PLAN

FEBRUARY 1955

A&B 426

732

DEFINITE PLAN REPORT
MINIDOKA PROJECT
NORTH SIDE PUMPING DIVISION

REVISION SHEET

REVISION NO.	REVISION DATE	PORTION OF REPORT AFFECTED	REVISION INSERTED* BY	REVISION INSERTED* DATE
3	12/59	A complete new Summary is herewith submitted for insertion in your copy or copies of the report. The underlying report has not been revised to incorporate these revisions. Revised sheets retained and marked superseded 12/59	MLM	1-5-60

* To be filled in by recipient of Revision Sheet

Date: December 30, 1959

Signature M. B. Austin
Regional Director

A&B 427

SUMMARY

MINIDOKA PROJECT - NORTH SIDE PUMPING DIVISION

LOCATION: Idaho, in Minidoka County near Rupert and lying in crescent shape generally north of the Minidoka Irrigation District.

AUTHORIZED: Public Law 864, 81st Congress, 2nd Session; approved September 30, 1950.

PLAN

The plan of development provides for the distribution of water lifted by an electrically-powered pumping plant from the Snake River, and from ground-water sources. The total area included in the plan embraces 78,596 irrigable acres lying in two units; 13,842 in Unit A, and 64,754 in Unit B. Unit A would be served by pumping from the Snake River. Water would be stored for Unit A in both the existing American Falls Reservoir and in the Palisades Reservoir, now under construction. A single pumping plant would lift water for Unit A from the river to a distribution system; five small relift pumps would serve 1,564 acres above the gravity distribution system. Unit B would be served by some 182 wells tapping the ground water, and the distribution would be accomplished by a separate lateral system for each well. Over 90 percent of the land in both units is Government-owned and will be subdivided into homestead units averaging about 120 irrigable acres each. A total of 655 farms is contemplated.

CONSTRUCTION COST (Cost data taken from PF-2 dated 12/23/59)

Unit "A"	
Main Pumping Plant	$ 834,601
Main Canal	108,541
Laterals	692,453
Drains	153,622
Pumping Substations	15,962
Unit "B"	
Deep Wells	5,162,736
Laterals	2,154,421
Drains	990,751
Pumping Substations	1,433,587
General Property	672,045
Settlers Assistance	52,509
Total Project Cost	$12,254,689
Deferred O&M Costs	57,466
Total Cost	$12,312,155

Summary - Minidoka Project, North Side Pumping Division

BENEFITS AND COSTS

	Annual Project Benefits		
	Direct	Indirect	Total
Irrigation 1/	$2,458,700	$3,189,000	$5,647,700
Fish and wildlife	--	--	28,300
Total			$5,676,000

1/ Adjusted for a 5-year development period, 100-year period of analysis. For a 50-year period of analysis the irrigation benefits would be Direct - $2,404,500; Indirect - $3,118,700; Total - $5,523,200.

Annual Equivalent Costs

	50-Year	100-Year
Construction cost	$12,254,689	$12,254,689
Less cost of investigation	250,000	250,000
Plus interest during construction ...	860,000	860,000
Net Federal investment	$12,864,689	$12,864,689
Annual equivalent cost	453,609	351,335
OM&R	839,183	839,183
Total annual costs	$ 1,292,792	$ 1,190,518

BENEFIT-COST RATIOS

	50-Year	100-Year
Project - Direct benefits	1.86 to 1.00	2.06 to 1.00
- Total benefits	4.39 to 1.00	4.77 to 1.00
Irrigation - Direct benefits	--	2.06 to 1.00
- Total benefits	--	4.74 to 1.00
Fish and Wildlife - Total benefits	--	1/

1/ Development of the project will result in benefits to wildlife but no costs are allocated to this function.

Summary - Minidoka Project, North Side Pumping Division

ALLOCATION AND ASSIGNED COSTS

Allocated	
Irrigation	$12,312,155
Assigned (Irrigation)	
American Falls Storage	71,000
Palisades Storage	698,000
Total irrigation cost	$13,081,155

REPAYMENT

Total irrigation cost	$13,081,155
Less credits	430,576
Irrigation repayment obligation	$12,650,579

	Annual	Per Acre
Irrigation installment (50 years)	$ 253,012	$ 3.22
Operating costs 1/	839,183	10.68
Total	$1,092,195	$13.90

1/ Annual costs projected on basis of current prices rather than a percentage thereof as used in the February 1955 Definite Plan Report.

IRRIGATION

Unit A

Land Class	Irrigable Acres	Payment Capacity 1/	Water Charge Acre	OM&R Acre	Construction Charge Acre
1	9,712	$16.11	$13.90	$10.68	$3.22
2	3,277	11.47	13.90	10.68	3.22
3	853	6.67	13.90	10.68	3.22
Subtotal	13,842	-	-	-	-

Unit B

1	26,907	$16.11	$13.90	$10.68	$3.22
2	23,412	11.47	13.90	10.68	3.22
3	14,435	6.67	13.90	10.68	3.22
Subtotal	64,754	-	-	-	-
TOTAL	78,596	$15.00	$13.90	$10.68	$3.22

1/ Payment capacity based on 1939-44 price level as presented in February 1955 D.P.R. The payment capacity for class 3 lands was re-evaluated in November 1955 on basis of actual land usage which showed these lands could pay up to $13.85 an acre on annual project costs (215 price level).

IRRIGATION (continued)

Full water supply to 78,596 acres.
Average frost-free period - About 130 days - 5/17 to 9/26.
Growing season - About 190 days - 4/15 to 10/22.
Irrigation season - April to October.
Elevation of project area - 4,100 to 4,300 feet.
Consumptive use requirement - 2.0 acre-feet per acre.
Effective precipitation - 0.2 foot
Diversion requirement - 4.33 acre-feet per acre on Unit A lands and 3.68 acre-feet per acre on Unit B lands (13,842 and 64,754 acres, respectively, of productive land).
Date first water applied - 1949 irrigation season.
Date all lands to be irrigated - 1962 irrigation season.

POWER AND MUNICIPAL WATER

Not included as project functions.

DISTRIBUTION SYSTEMS

Unit A Pumping Plant

Capacity ..... 240 second feet
Total dynamic head ..... 168 feet
Number of pumping units 5
Motors - three 1,500 horsepower, horizontal, synchronous
one 1,000 horsepower, horizontal, synchronous
one 500 horsepower, horizontal, synchronous
Pumphouse ..... 40 feet by 102 feet

Unit A Relift

Pumps ..... Vertical shaft turbine type
Pumping head ..... 20 feet
Estimated average discharge ..... 5.2 c.f.s.
Number of pumps 5
Motors - Vertical induction outdoor type, no housing required.
Starting equipment - Across the line type, protection against voltage irregularities, lightning and motor bearing overheating.

Unit A Main Canal
Length ..... 4.4 miles
Capacity ..... 240 second feet

DISTRIBUTION SYSTEMS (continued)

Unit A Laterals

Type	Open earth
Structures	Concrete
Total length	45 miles
Capacity range	2.5 c.f.s. to 75 c.f.s.

Unit B Pumps, Motors and Starting Equipment

Deepwells

Pumps	Line shaft vertical turbine
Estimated average pumping head	198 feet
Estimated average discharge	5.6 c.f.s.
Number of pumps	192
Motors	vertical, hollow shaft, induction outdoor type, no housing required
Starting equipment	across the line type, protection against voltage irregularities, lightning and motor bearing overheating.

Relifts

Pumps	Vertical shaft turbine type
Pumping head	33.1 feet
Discharge	3.1 c.f.s.
Number of pumps	7
Motors	Vertical induction outdoor type, no housing required.
Starting equipment	Across the line type, protection against voltage irregularities, lightning and motor bearing overheating.

Unit B Laterals

Type	Open earth
Structures	Concrete
Total length	165 miles
Capacity range	1.5 c.f.s. to 10.5 c.f.s.

Drains ..... 373 miles

Summary - Minidoka Project, North Side Pumping Division

HYDROLOGY

An adequate supply of water would be available for Unit A from natural flow of the Snake River, augmented by 47,000 acre-feet of storage in American Falls Reservoir and 90,000 acre-feet of space in Palisades Reservoir. In 1959 there were 186 deep wells developed which furnished a full water supply to over 74,642 acres. The operation of these wells together with a hydrological program being carried on through observation wells indicates that there is ample ground water for full irrigation of Unit B. The ground-water supply is believed to have its source from deep percolation losses from the Snake River and tributaries, and from irrigation in the Upper Snake River Basin to the northeast.

REMARKS

Although the exclusion of Group 8 wells decreased project acreage from 80,972 to 78,596, in several instances, the amount of land in a specific land class exceeds the acreage of that land class shown in the land classification certification. This situation results from the refinements in land classification in the process of setting up farm units. All lands scheduled for development are covered by land classification certification.

DERIVATION OF IRRIGATION BENEFITS

MINIDOKA PROJECT - NORTH SIDE PUMPING DIVISION, IDAHO

Item	Benefits-1939-44 Price Level 1/			Benefits - 250/265 Price Level 2/		
	Direct	Indirect	Public	Direct	Indirect	Public
	dollars	dollars	dollars	dollars	dollars	dollars
Local sales	--	59,000	--	--	91,000	--
Local and nonlocal processing	--	360,000	--	--	1,222,300	--
Increased expenses	--	575,000	--	--	999,600	--
Net farm income	--	--	--	3,388,800	--	--
Family living	560,000	--	--	--	--	--
Payment capacity	1,056,000	--	--	--	--	--
Farm investment	155,000	--	--	--	--	--
Settlement opportunities	--	--	700,000	- 808,900	--	808,900
Community services	--	--	122,000	--	--	224,400
Total	1,771,000	994,000	822,000	2,579,900	2,312,900	1,033,300
Adjusted 5-year development period (100-year factor-- .953)				2,458,700	2,204,300	984,700

1/ Benefits based on 77,650 acres in Definite Plan Report.
2/ Benefits based on 78,596 acres--the present anticipated project development.

Taylor

superseded 12/59

DEFINITE PLAN REPORT
MINIDOKA PROJECT
NORTH SIDE PUMPING DIVISION

REVISION SHEET

REVISION NO.	REVISION DATE	PORTION OF REPORT AFFECTED	REVISION INSERTED* BY	REVISION INSERTED* DATE
2	9/58	Summary Add new summary pages i through vii. You may not wish to remove old pages i through iv because the new material has not been carried through the report.	at	12/3/58

* To be filled in by recipient of Revision Sheet

Date: September 25, 1958

Signature H. T. Nelson
Regional Director

A&B 435

Superseded
12/59

SUMMARY

MINIDOKA PROJECT - NORTH SIDE PUMPING DIVISION

LOCATION: Idaho, in Minidoka County near Rupert and lying in crescent shape generally north of the Minidoka Irrigation District.

AUTHORIZED: Public Law 864, 81st Congress, 2nd Session; approved September 30, 1950.

PLAN

The plan of development provides for the distribution of water lifted by an electrically-powered pumping plant from the Snake River, and from ground-water sources. The total area included in the plan embraces 80,980 irrigable acres lying in two units; 13,650 in Unit A, and 67,330 in Unit B. Unit A would be served by pumping from the Snake River. Water would be stored for Unit A in both the existing American Falls Reservoir and in the Palisades Reservoir, now under construction. A single pumping plant would lift water for Unit A from the river to a distribution system; five small relift pumps would serve 1,564 acres above the gravity distribution system. Unit B would be served by some 192 wells tapping the ground water, and the distribution would be accomplished by a separate lateral system for each well. Over 90 percent of the land in both units is Government-owned and will be subdivided into homestead units averaging about 120 irrigable acres each. A total of 673 farms is contemplated.

CONSTRUCTION COST (Cost data taken from PF-2b dated 8/15/58)

Unit "A"	
Main Pumping Plant	$ 815,260
Main Canal	108,185
Laterals	664,000
Drains	150,987
Pumping Substations	16,834
Unit "B"	
Deep Wells	4,737,445
Laterals	2,095,457
Drains	918,560
Pumping Substations	1,540,191
General Property	960,859
Settlers Assistance	70,000
Future Year Capacity Provisions	55,000
Total Project Cost	$12,132,778

Superseded 12/59

Summary - Minidoka Project, North Side Pumping Division

BENEFITS AND COSTS

	Annual Project Benefits		
	Direct	Indirect	Total
Irrigation 1/	$2,815,200	$3,027,500	$5,842,700
Fish and wildlife	--	--	28,300
Total			$5,871,000

1/ Adjusted for a 5-year development period, 100-year period of analysis. For a 50-year period of analysis the irrigation benefits would be Direct - $2,756,200; Indirect - $2,963,900; Total - $5,720,100.

Annual Equivalent Costs

	50-Year	100-Year
Construction cost	$12,132,778	$12,132,778
Less cost of investigation	250,000	250,000
Plus interest during construction ..	857,400	857,400
Net Federal investment	$12,740,178	$12,740,178
Annual equivalent cost	449,218	347,934
OM&R	839,183	839,183
Total annual costs	$ 1,288,401	$ 1,187,117

BENEFIT-COST RATIOS

	50-Year	100-Year
Project - Direct benefits	2.14 to 1.00	2.37 to 1.00
- Total benefits	4.44 to 1.00	4.94 to 1.00
Irrigation - Direct benefits	--	2.37 to 1.00
- Total benefits	--	4.92 to 1.00
Fish and Wildlife - Total benefits	--	1/

1/ Development of the project will result in benefits to wildlife but no costs are allocated to this function.

Superseded 12/59

Summary - Minidoka Project, North Side Pumping Division

ALLOCATION AND ASSIGNED COSTS

Allocated	
Irrigation	$12,132,778
Assigned (Irrigation)	
American Falls Storage	71,000
Palisades Storage	698,000
Total irrigation cost	$12,901,778

REPAYMENT

Total irrigation cost	$12,901,778
Less credits	430,576
Irrigation repayment obligation	$12,471,202

	Annual	Per Acre
Irrigation installment (50 years)	$ 249,424	$ 3.08
Operating costs 1/	839,183	10.36
Total	$1,088,607	$13.44

1/ Annual costs projected on basis of current prices rather than a percentage thereof as used in the February 1955 D.P.R.

IRRIGATION

Unit A

Land Class	Irrigable Acres	Payment Capacity 1/	Water Charge Acre	OM&R Acre	Construction Charge Acre
1	9,960	$16.11	$13.44	$10.36	$3.08
2	3,030	11.47	13.44	10.36	3.08
3	660	6.67	13.44	10.36	3.08
Subtotal	13,650	-	-	-	-

Unit B

1	27,419	$16.11	$13.44	$10.36	$3.08
2	25,655	11.47	13.44	10.36	3.08
3	14,256	6.67	13.44	10.36	3.08
Subtotal	67,330	-	-	-	-
TOTAL	80,980	$15.00	$13.44	$10.36	$3.08

1/ Payment capacity based on 1939-44 price level as presented in February 1955 D.P.R. The payment capacity for class 3 lands was re-evaluated in November 1955 on basis of actual land usage which showed these lands could pay up to $13.85 an acre on annual project costs (215 price level).

Superseded 12/59

IRRIGATION (continued)

Full water supply to 80,980 acres.
Average frost-free period - About 130 days - 5/17 to 9/26.
Growing season - About 190 days - 4/15 to 10/22.
Irrigation season - April to October.
Elevation of project area - 4,100 to 4,300 feet.
Consumptive use requirement - 2.0 acre-feet per acre.
Effective precipitation - 0.2 foot
Diversion requirement - 4.33 acre-feet per acre on Unit A lands and 3.68 acre-feet per acre on Unit B lands (12,830 and 63,290 acres, respectively, of productive land).
Date first water applied - 1949 irrigation season.
Date all lands to be irrigated - 1962 irrigation season.

POWER AND MUNICIPAL WATER

Not included as project functions.

DISTRIBUTION SYSTEMS

Unit A Pumping Plant

Capacity	240 second feet
Total dynamic head	168 feet
Number of pumping units	5
Motors - three	1,500 horsepower, horizontal, synchronous
one	1,000 horsepower, horizontal, synchronous
one	500 horsepower, horizontal, synchronous
Pumphouse	40 feet by 102 feet

Unit A Relift

Pumps	Vertical shaft turbine type
Pumping head	20 feet
Estimated average discharge	5.2 c.f.s.
Number of pumps	5
Motors -	Vertical induction outdoor type, no housing required.
Starting equipment -	Across the line type, protection against voltage irregularities, lightning and motor bearing overheating.

Unit A Main Canal

Length	4.4 miles
Capacity	240 second feet

Superseded 12/59

DISTRIBUTION SYSTEMS (continued)

Unit A Laterals

Type	Open earth
Structures	Concrete
Total length	45 miles
Capacity range	2.5 c.f.s. to 75 c.f.s.

Unit B Pumps, Motors and Starting Equipment

Deepwells

Pumps	Line shaft vertical turbine
Estimated average pumping head	198 feet
Estimated average discharge	5.6 c.f.s.
Number of pumps	192

Motors - vertical, hollow shaft, induction outdoor type, no housing required

Starting equipment - across the line type, protection against voltage irregularities, lightning and motor bearing overheating.

Relifts

Pumps	Vertical shaft turbine type
Pumping head	33.1 feet
Discharge	3.1 c.f.s.
Number of pumps	7

Motors - Vertical induction outdoor type, no housing required.

Starting equipment - Across the line type, protection against voltage irregularities, lightning and motor bearing overheating.

Unit B Laterals

Type	Open earth
Structures	Concrete
Total length	165 miles
Capacity range	1.5 c.f.s. to 10.5 c.f.s.

Drains	373 miles

Superseded
12/59

Summary - Minidoka Project, North Side Pumping Division

HYDROLOGY

An adequate supply of water would be available for Unit A from natural flow of the Snake River, augmented by 47,000 acre-feet of storage in American Falls Reservoir and 90,000 acre-feet of space in Palisades Reservoir. In 1958 there were 158 deep wells developed which furnished a full water supply to over 56,000 acres. The operation of these wells together with a hydrological program being carried on through observation wells indicates that there is ample ground water for full irrigation of Unit B. The ground-water supply is believed to have its source from deep percolation losses from the Snake River and tributaries, and from irrigation in the Upper Snake River Basin to the northeast.

Superseded 12/59

Summary - Minidoka Project, North Side Pumping Division

DERIVATION OF IRRIGATION BENEFITS

MINIDOKA PROJECT - NORTH SIDE PUMPING DIVISION, IDAHO

Item	Benefits-1939-44 Price Level 1/			Conversion	Benefits - 250/265 Price Level 2/		
	Direct	Indirect	Public	Factors	Direct	Indirect	Public
	dollars	dollars	dollars	dollars	dollars	dollars	dollars
Local sales	--	59,000	--	Derived	--	80,700	--
Local and nonlocal processing	--	360,000	--	Derived	--	1,101,900	--
Increased expenses	--	575,000	--	Derived		985,900	--
Family living	560,000	--	--	Derived	1,034,400	--	--
Payment capacity	1,056,000	--	--	Derived	1,653,600	--	
Farm investment	155,000	--	--	Derived	266,100	--	
Settlement opportunities	--	--	700,000	Derived	--	--	829,800
Community services	--	--	122,000	Derived	--	--	178,400
Total	1,771,000	994,000	822,000	--	2,954,100	2,168,600	1,008,200
Adjusted 5-year development period (.953)					2,815,300	2,066,700	960,700

1/ Benefits based on 77,650 acres in D.P.R.
2/ Benefits based on 80,980 acres--the present anticipated project development.

DEFINITE PLAN REPORT
MINIDOKA PROJECT
NORTH SIDE PUMPING DIVISION
- - -
REVISION SHEET

REVISION		PORTION OF REPORT AFFECTED	REVISION INSERTED*	
NO.	DATE		BY	DATE
1a	3-55	Revise in Ink Change page number of page 136 to 137 Change page number of page 137 to 136 Change order of pages to conform to new numbering (These pages inadvertently transposed in Rev. No. 1, dated 2-55)	WW	3/23/55

*To be filled in by recipient of Revision Sheet

Date: March 18, 1955

Signature Wm H Tuller
Acting Regional Director

DEFINITE PLAN REPORT
MINIDOKA PROJECT
NORTH SIDE PUMPING DIVISION

- - -

REVISION SHEET

REVISION		PORTION OF REPORT AFFECTED	REVISION INSERTED*	
NO.	DATE		BY	DATE
1	2-55	This is a revision of the Definite Plan Report of August 1952 and completely supersedes that report.		

*To be filled in by recipient of Revision Sheet

Date: February 28, 1955

(Signature) Regional Director

A&B 445

UNITED STATES DEPARTMENT OF THE INTERIOR

DOUGLAS MCKAY, Secretary

BUREAU OF RECLAMATION

WILBUR A. DEXHEIMER, Commissioner

REGION 1

H. T. NELSON, Regional Director

M I N I D O K A P R O J E C T

N O R T H S I D E P U M P I N G D I V I S I O N

DEFINITE PLAN REPORT

Volume I - General Plan

Boise, Idaho
February-1955

SUMMARY

MINIDOKA PROJECT - NORTH SIDE PUMPING DIVISION

LOCATION: Idaho, in Minidoka County near Rupert and lying in crescent shape generally north of the Minidoka Irrigation District.

AUTHORIZED: Public Law 864, 81st Congress, 2nd Session; approved September 30, 1950.

PLAN

The selected plan of development involves the distribution of water lifted by an electrically-powered pumping plant from the Snake River, and from ground-water sources. The total area included in the plan embraces 77,650 irrigable acres lying in two units; 13,650 in Unit A, and 64,000 in Unit B. Unit A would be served by pumping from the Snake River. Water would be stored for Unit A in both the existing American Falls Reservoir and in the Palisades Reservoir, now under construction. A single pumping plant would lift water for Unit A from the river to a distribution system; five small relift pumps would serve 1,564 acres above the gravity distribution system. Unit B would be served by some 175 wells tapping the ground water, and the distribution would be accomplished by a separate lateral system for each well. Over 90 percent of the land in both units is Government-owned and will be subdivided into homestead units averaging about 110 irrigable acres each. A total of 695 farms is contemplated.

PHYSICAL FEATURES

Unit A Pumping Plant

Capacity	240 second feet
Total dynamic head	168 feet
Number of pumping units	5
Motors - three	1,500 horsepower, horizontal, synchronous
one	1,000 horsepower, horizontal, synchronous
one	500 horsepower, horizontal, synchronous
Pumphouse	40 feet by 102 feet

Unit A Main Canal

Length	4.4 miles
Capacity	240 second feet

Summary - Minidoka Project, North Side Pumping Division

Unit A Laterals

Type	Open earth
Structures	Concrete
Total length	45 miles
Capacity range	2.5 c.f.s. to 75 c.f.s.

Unit B Pumps, Motors and Starting Equipment

Pumps	Line shaft vertical turbine
Estimated average pumping head	198 feet
Estimated average discharge	5.6 c.f.s.
Number of pumps	175

Motors - vertical, hollow shaft, induction outdoor type, no housing required

Starting equipment - across the line type, protection against voltage irregularities, lightning and motor bearing overheating

Unit B Laterals

Type	Open earth
Structures	Concrete
Total length	150 miles
Capacity range	1.5 c.f.s. to 10.5 c.f.s.

HYDROLOGY

An adequate supply of water would be available for Unit A from natural flow of the Snake River, augmented by 47,593 acre-feet of storage in American Falls Reservoir and 90,000 acre-feet of space in Palisades Reservoir. Advance planning investigations and initial development indicate there would be ample ground water for full irrigation of Unit B. A hydrological program is being carried on by use of observation wells to indicate the supply. The ground-water supply is believed to have its source from deep percolation losses from the Snake River and tributaries, and from irrigation in the Upper Snake River Basin to the northeast.

Summary - Minidoka Project, North Side Pumping Division

OFFICIAL ESTIMATE

American Falls Storage (net)	$ 71,000
Palisades Reservoir Storage	810,000
Pumping Plants Unit A	952,800
Deep Wells	3,472,114
Canals and Conduits	84,000
Laterals	2,098,000
Drains	355,500
Settler Assistance	700,000
Transmission Lines, Switchyards and Substations	744,186*
Pumping Substation	1,375,900
General Property	676,500
Transitional Irrigation Development	55,000
Total Official Estimate	$11,395,000

* Construction not contemplated.

ANNUAL PROJECT BENEFITS

Irrigation	$ 3,418,000
Fish and Wildlife	30,000
Total	$ 3,448,000

ALLOCATION OF COSTS

Official Estimate	$11,395,000
Total Cost Subject to Allocation	$11,395,000
Allocation to Irrigation	10,650,814
Allocation Transmission Lines	744,186
Total Allocation	$11,395,000

IRRIGATION REPAYMENT

Payments from Water Users	$10,220,238
Credits from Sale of Jackson Lake Space and Other Sources	430,576
Total Irrigation Repayment	$10,650,814

Summary - Minidoka Project, North Side Pumping Division

AVERAGE ANNUAL WATER CHARGE

	Division	Per Acre
Construction Cost	$203,800	$ 2.63
Operation and Maintenance	186,400	2.40
Power Cost	383,800	4.94
Reserve for Replacement	107,200	1.38
Totals (rounded)	$881,000	$11.35

Agricultural economy studies show that project farmers will be able to pay from $11.00 to $12.00 per acre for water and still maintain an adequate level of living. Essential to the payment of the water charge estimated for this project is the establishment and continuance of adequately sized farm units. The average size of farms contemplated on Class 1 land include 90 acres of irrigable land and those on Class 2 land, 113 acres.

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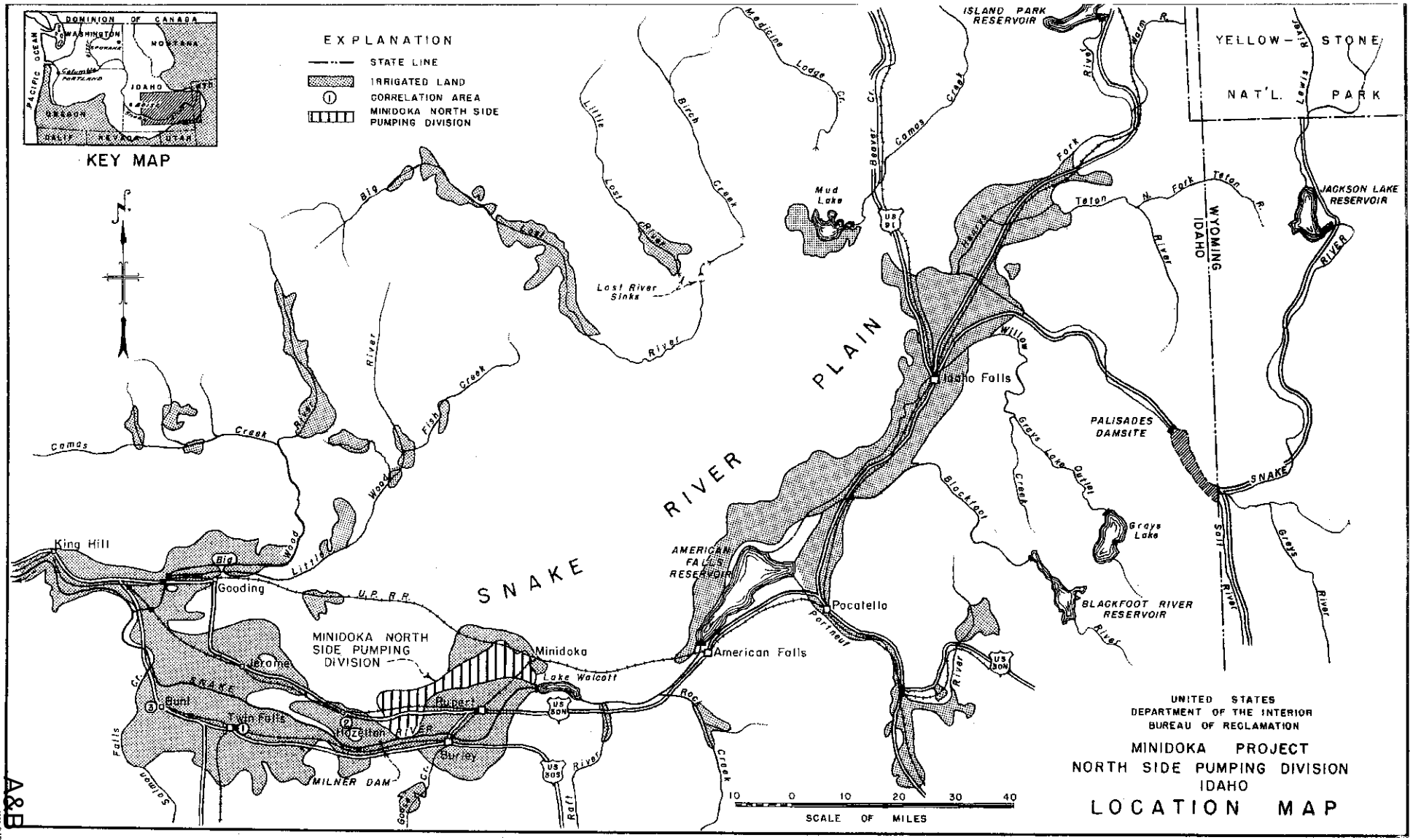
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WASHINGTON
MONTANA
IDAHO
OREGON
NEVADA
UTAH
PACIFIC OCEAN
EXPLANATION
STATE LINE
IRRIGATED LAND
CORRELATION AREA
MINIDOKA NORTH SIDE PUMPING DIVISION
ISLAND PARK RESERVOIR
YELLOW-STONE NAT'L. PARK
JACKSON LAKE RESERVOIR
WYOMING
IDAHO
Medicine Lodge Cr.
Little Lost River
Birch Creek
Big Lost River
Mud Lake
Lost River Sinks
Beaver Creek
Camas Creek
Warm River
Teton River
N. Fork Teton R.
Henrys Fork
Snake River
Willow Creek
Idaho Falls
PLAIN
SNAKE RIVER
PALISADES DAMSITE
Grays Lake Outlet
Blackfoot River
Grays Lake
BLACKFOOT RIVER RESERVOIR
Portneuf River
Pocatello
AMERICAN FALLS RESERVOIR
American Falls
Rock Creek
Raft River
Goose Cr.
Big Camas Creek
Little Wood River
Big Wood River
Fish Creek
King Hill
Gooding
U.P. R.R.
MINIDOKA NORTH SIDE PUMPING DIVISION
Minidoka
Lake Walcott
Jerome
Cr.
Snake
Falls
Salmon
Burley
MILNER DAM
Rupert
Hazelton
Twin Falls
Buhl
US 30N
US 30S
US 91
10 0 10 20 30 40
SCALE OF MILES
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
MINIDOKA PROJECT
NORTH SIDE PUMPING DIVISION
IDAHO
LOCATION MAP

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CHAPTER I

THE AREA AND THE PROJECT

The North Side Pumping Division of the Minidoka Project would provide for the irrigation of 77,650 irrigable acres of potentially productive, dry sagebrush land on the Snake River Plain in southeastern Idaho. The lands of the Division share the physical characteristics which have made possible elsewhere in the Upper Snake River Valley one of the most successful irrigation developments in the United States.

Evaluated annual monetary benefits resulting from development of the North Side Pumping Division will be several times its annual cost. Moreover, full repayment of the reimbursable costs of the development seems assured. This repayment is in prospect within the 50-year repayment period provided for in the authorizing act, Public Law 864, 81st Congress, 2d Session, approved September 30, 1950. Repayment of the cost of irrigation facilities can be made entirely by the future residents of the project area.

Nearly 695 new farm units can be made available for settlement by development of the North Side Pumping Division. Almost all of them will be on Federal public domain and, consequently, would be made available for homestead entry. Under prevailing law, veterans of World War II and the Korean conflict would have preference in acquiring the new farms in this manner.

The plan presented in this report contemplates development of 77,650 acres of irrigable land. Of the total irrigable acreage, 13,650 would be supplied by pumping from Snake River and is designated as Unit A. The remainder of the Division, 64,000 irrigable acres, would be supplied from 175 wells tapping the great groundwater body underlying the area.

An integral part of the development plan is provision for storage space in the existing American Falls Reservoir and in Palisades Reservoir which is under construction.

Hydroelectric power for pumping would be obtained initially from the Minidoka and Anderson Ranch Powerplants and subsequently, when they are completed, from the Palisades and American Falls Powerplants.

GENERAL DESCRIPTION

Location

The lands of the North Side Pumping Division are located in Minidoka and Jerome Counties (see Location Map). The Minidoka Irrigation District (the Gravity Division of the Minidoka Project), comprising the prosperous farming area in the vicinity of the town of Rupert, borders the project on the south. West of the North Side Pumping Division are the irrigated farmlands of the Twin Falls North Side development and those of the Gooding Division of the Minidoka Project. North and east of the Division are wide, empty expanses of the Snake River Plain characterized by lava rock outcrops and shallow soils.

The project area is relatively compact; it ranges from two to seven miles in width and is about 30 miles long. It trends generally from east to west, forming a roughly crescent-shaped land body contiguous to the northern and western borders of the Minidoka Irrigation District.

Physical Features

The Snake River Plain, on which the North Side Pumping Division lies, was built up by a series of basaltic lava flows of unknown depth. The volcanic activity which gave rise to the lava flows took place at intervals over a long span of time, with long periods of quiescence between eruptions. Beneath the surface soils there is no uniformity in the rock structure. Old buried canyons of the Snake River, deposits of alluvium between flows, and brecciated contact zones, together with the cracks and crevices formed in the cooling lava, make up a very porous formation. Heavy deep percolation losses from surface flows in river channels and from irrigated lands of the upper valley form a tremendous ground-water body that moves westward and discharges into the Snake River between Milner Dam and King Hill, Idaho. (See Location Map).

Topography

The surface of the plain, although generally smooth, lacks a well defined drainage pattern because of its youthful stage of geologic development. In the project area, the irregular benches, pressure ridges, and depressions of the last lava flow have been covered with a mantle of wind-borne material. This deposit ranges in depth up to 45 feet and has had a smoothing effect on the topography.

Gentle, undulating slopes and large expanses of smooth benches are characteristic of the North Side Pumping Division. The general topography is well suited to irrigation farming because of the low gradients and smooth surface. The high permeability of the soil mantle and of the underlying rock provide excellent internal drainage, which offsets the lack of a distinct surface drainage pattern except in a number of very small areas.

The eastern portion of the Division has numerous, small, high areas which would complicate distribution of water from a main canal and lateral system. This topographic feature, however, will not affect water distribution from wells located on these high points. The central portion of the area has some enclosed basins or "potholes." Drainage of surface waste from these depressions will be accomplished with inverted drainage wells or sump wells drilled to crevices or highly porous zones in the underlying lava rock. The southwestern portion of the area is made up of flat to gently rolling land bodies surrounding a few large, high areas. In contrast to the eastern portion, it is well suited to the distribution of water from an ordinary canal system.

Soils

The soils on much of the Snake River Plain, including those on lands of the Division, have developed from wind-borne material deposited on the irregular surface of the lava flows. In general, the soils of the Division, described in detail in Chapter II of the report, are light-colored, free-working in the surface layer, and high in mineral nutrients. The subsoils have a high lime content and varying degrees of compactness. Typically, the soils are deep and friable, and have a high water-holding capacity. In texture, they range from silt loams to very fine sandy loams. Similar soils in nearby areas have proven to be very productive under irrigation.

Climate

The climate of the North Side Pumping Division, in common with that of most of the Snake River Plain, is arid. Precipitation, especially during the growing season, is very low; temperatures are high and humidities are low during the summer; and the growing season and frost-free periods are of moderate length. During the 41 years of record, the annual precipitation has averaged less than 10 inches. Most of the precipitation occurs as rainfall, but an average of about 26 inches of snowfall (equivalent to about 2.8 inches of rainfall) is received in the winter months. Growing-season rainfall (May to October) inclusive, averages only about 4.2 inches. The time and occurrence of the growing season rainfall is unpredictable, inasmuch as it is received from convectional showers which may bring almost half the 4.2 inches in a single month, and little or

none in other months. Hail falls occasionally but usually is not of sufficient intensity or extent to cause serious crop damage.

Temperatures in the Division are typically moderate in winter and high in summer. Average winter maxima and minima are about 45 and 20 degrees, respectively. Subzero winter temperatures occur occasionally in each of the winter months. During the summer months, days are hot and nights are cool. With sunshine prevailing about 70 percent of the daylight hours, daily maximum temperatures average about 85 degrees, but often reach 100 degrees. Summer nighttime minimum temperatures average slightly above 40 degrees, although readings in the 30's are not unusual. The high summer temperatures are accompanied by low humidity.

The growing season, when defined as the approximate period during which the more hardy agricultural crops will grow, is about 190 days, and extends from the latter part of April to latter part of October. The fluctuation in length of growing season from year to year is typically not great, but in exceptional years the season may be as long as 230 days or as short as 160 days. The frost-free period averages about 130 days and extends from about the middle of May to the latter part of September. In contrast with the length of growing season, the frost-free period, which commonly is marked at either or both ends by a light frost which does not damage hardy crops, has a relatively wide variation from year to year. Frost-free periods of more than 160 days and of less than 100 days have occurred at Rupert in the past.

Over the exposed areas of the Snake River Plain such as the North Side Pumping Division, winds frequently attain high velocities which are sustained for hours. Although winds of destructive force are of rare occurrence, velocities in excess of 45 miles per hour have been recorded. Winds are highest in late winter and early spring and are lowest during summer or autumn. The maxima recorded in the past, however, are in excess of 35 miles per hour in all months.

A summary of climatological data for Rupert, which is representative of climatic conditions in the North Side Pumping Division, is presented in table 1.

SETTLEMENT AND DEVELOPMENT

Historical Background

The Snake River Plain, endowed with an abundance of fertile, though arid land, and traversed by the Snake River, early provided an attractive setting for irrigation development. From a start about 1879, development was so rapid that virtually all of the land now

Table 1.--Summary of climatological data

Station at Rupert, Idaho (1907-47)

	Precipitation			Temperature		
	Mean Monthly	Max. yr. (1913-14)	Min. Yr. (1933-34)	Average Daily Mean	Average 1/ Daily Maximum	Average 1/ Daily Minimum
	inches	inches	inches	degrees F	degrees F	degrees F
October	0.94	0.64	0.06	49.2	63.9	32.8
November	1.00	2.16	0.32	36.9	49.7	24.0
December	0.97	1.88	1.00	27.7	37.0	16.0
January	1.06	2.27	0.74	24.6	35.5	14.4
February	0.95	0.94	1.26	29.8	40.7	20.2
March	0.78	0.20	0.49	38.3	51.4	26.0
April	1.02	2.02	0.39	47.0	61.8	31.5
May	1.01	0.89	0.20	55.3	70.5	38.7
June	0.84	2.06	0.38	63.1	79.2	42.1
July	0.41	0.26	0.06	71.9	88.7	53.3
August	0.41	0.63	0.41	68.6	85.8	50.2
September	0.56	1.30	0.16	58.8	75.6	40.4
Annual	9.95	15.25	5.47	47.6	61.6	32.5

1/ Period 1907-30

irrigated on the Plain upstream from the site of the Minidoka Project was under ditch by 1900. Development of the Minidoka Project and the North and South Side Twin Falls Projects was initiated shortly thereafter and the irrigated acreage brought essentially to its present proportions by 1920. The total area served by all existing irrigation developments in the Upper Snake River Basin are somewhat more than 1,500,000 acres.

The development of irrigated land years ago outran the supply of water available during summer from the natural flow of the Snake River, and a series of storage projects were undertaken. The storage, virtually all of it developed since 1900, has reached a total capacity of nearly 4,000,000 acre-feet. The Palisades Reservoir Project, now under construction, will add an additional 1,400,000 acre-feet of storage space and will make available a large portion of the remaining, unused water of the Snake River above Milner Diversion Dam. Thus, on the basis of present water use and rights, the Upper Snake River Basin is approaching full utilization of its surface water resources.

The North Side Pumping Division of the Minidoka Project has been a prospective part of the irrigation development in the Upper Snake River Basin for several decades. The circumstances which brought about prior development of other, nearby areas are discussed subsequently in connection with early investigations of the Division. Those other developments, with their flourishing agricultural communities, abundantly demonstrate the benefits to be achieved from development of the Division.

Local Economy

The government lands of the Division had no permanent residents, until opened to entry, and are dry, providing only occasional seasonal use as sheep range. Undeveloped privately-owned lands in the general area adjacent to the Division and former State school sections dispersed within the perimeter of the Division are rapidly being developed by deep well pumping from the same ground-water body underlying the Division. In the period 1947-1954, some 125 deep well pumps have been installed and approximately 35,000 acres have been placed under irrigation as shown on map titled Government and Private Irrigation Development. It is estimated that up to 25,000 acres of privately-owned lands adjacent to the project area remain for future development with ground water. Full development of the Division will tend to consolidate these isolated tracts into one economic unit, which will become an integral part of the adjacent larger area where successful irrigation agriculture is now established. The latter area provides a guide to the prospective use of Division lands and its existing towns will afford many of the basic services to be required by settlers on the Division.

Irrigation Agriculture

In the immediately adjacent Minidoka Irrigation District, and in the nearby Burley and Gooding Districts and North and South Side Twin Falls Projects, lands similar to those of the North Side Pumping Division are used with great success to support an intensive, diversified irrigation agriculture. Although hay, pasture, and grain produced largely for the dairy industry and for range livestock predominate in acreage, cash crops have a very important place in the farm economy. The area is famous for the quality and yield of its potatoes, beans, and onions, and other important cash crops include peas and sugar beets. In 1939, potatoes, sugar beets, and beans occupied more than one-fifth (140,000 acres) of the irrigated land (675,000 acres) of the six counties in which the developments noted above are located, and had a value ($8,675,000) equivalent to 38 percent of the total income in the area from all crops and livestock ($22,699,000).

Transportation

Rail transportation currently available to established communities will serve settlers on the Division. The main transcontinental line of the Union Pacific Railroad to Pacific Northwest points crosses the northernmost part of the Division; and branch lines, serving towns of the existing irrigated areas, run southward from a connection with the main line at Minidoka, a town near the northeast corner of the North Side Pumping Division.

United States Highway 30 passes through the existing irrigated areas south of the Division, and those areas are served by a well developed network of state and county roads. Extensions of the county network already provide the nucleus of a system to serve lands of the Division, although much new county road construction will be required to serve adequately the settlers on the lands to be developed.

Industry

Industrial and commercial activities in towns of the area are almost exclusively confined to the processing and handling of farm products and to the provision of other services and goods required by the local population. A sugar factory is located at the nearby town of Paul, and all other processing and warehousing facilities likely to be required by settlers on the Division are already established at reasonably accessible centers. These services can be expected to fill the needs of settlers on the Division, at least during earlier stages of development.

INVESTIGATIONS

The plan of development for the North Side Pumping Division, outlined briefly in the first section of this chapter, differs significantly from earlier, widely considered plans for irrigating lands of the Division, conceived more than 40 years ago, simultaneously with plans for developing other portions of the Minidoka Project. The circumstances that have occasioned the prior development of the other lands in the project, which have been in production for several decades, and the deferment of the North Side Pumping Division are of significance to the plan adopted for the project.

Early Plans for Development of the North Side Division

Although detailed investigations of facilities to deliver water to lands of the North Side Pumping Division were not made in the earlier years, when development of other divisions of the Minidoka Project was under way, some studies were made. Moreover, the provision of a water supply for the North Side Pumping Division lands was continually held in mind in connection with the development of storage facilities for the Minidoka Project as a whole.

Jackson Lake Reservoir

The development of storage for the Minidoka Project, as originally conceived and described in a Board of Engineers report dated March 21, 1904, contemplated the provision of 555,000 acre-feet of storage in Jackson Lake. Of this total, 216,000 acre-feet were estimated as adequate, in combination with unappropriated natural flows, to meet needs on 120,000 acres proposed for immediate development in the Gravity Division (now the Minidoka Irrigation District) and the South Side Pumping Division (now the Burley Irrigation District). The remaining storage capacity (339,000 acre-feet) was to be reserved for future "new divisions" of the Minidoka Project. A temporary dam built at the outlet of Jackson Lake during the period of 1906-07 provided 200,000 acre-feet of storage to meet the earliest need, and served as a cofferdam for a larger structure, completed in November 1911, which afforded storage capacity of 380,000 acre-feet. Construction of the Gravity Division was completed in 1907 and that of the South Side Pumping Division in 1909.

On March 18, 1908, the lands of the North Side Pumping Division were withdrawn from public entry by an order of the Secretary of the Interior, and in that same year a preliminary study of development of pumping from Lake Walcott was made. The Reclamation Record for November 1908 stated:

> "A reconnaissance survey was made of 150,000 acres of high land on the North Side of the present project for the purpose of determining the feasibility of irrigating it by pumping."

Additional study of the Division was not undertaken until 1917. Costs for the North Side Pumping Division were prospectively higher than for lands of the other divisions, and development of the latter met immediate demands and needs. Moreover, attention was drawn to the need for additional storage for lands already settled and cultivated which had been demonstrated by irrigation experience and by final establishment of the natural flow rights of the Minidoka Project in the adjudication of Snake River water rights set forth in the Foster Decree of 1913.

Subsequently, two increases were made in the storage capacity of Jackson Lake Reservoir, and the storage space there was reallocated in favor of existing developments. Interest in the North Side Pumping Division, however, revived shortly thereafter. Detailed studies of it were made, and the plans formulated for storage in the American Falls Reservoir included provision for the North Side Pumping Division.

The first enlargement of the Jackson Lake Reservoir, made between 1913 and 1916, added 409,000 acre-feet to the then existing capacity of 380,000 acre-feet. The enlargement was financed by and the added space was allotted to the Kuhn Irrigation Canal Company, predecessor of the North Side Canal Company and the Twin Falls Canal Company, to serve lands previously developed by that company. At the same time (1916), a reallocation was made of the 380,000 acre-feet of storage for the Minidoka Project. The 216,000 acre-feet of space initially allotted to the Gravity and South Side Pumping Divisions was increased to 268,000 acre-feet, the space reserved for new divisions was reduced to 102,000 acre-feet and 10,000 acre-feet were allotted to the North Side Canal Company. Shortly afterward, in 1916 and 1917, the 102,000 acre-feet of space for new divisions was sold to 16 canal companies and irrigation districts in the upper valley, to meet urgent needs for additional water on their lands. The selling price was fixed at the then estimated cost of replacing the storage in the reservoir under consideration at American Falls. (See the discussion of credits to the North Side Pumping Division in the Financial Summary Chapter of this report.)

The second enlargement of the Jackson Lake Reservoir storage capacity, made between 1917 and 1919 by dredging the channel above and below the dam, added 58,000 acre-feet of capacity, and this increase was allotted to new divisions of the Minidoka Project. Subsequent to the start of construction on the American Falls Reservoir, (1925), in which provision was made for the North Side Pumping Division,

the 58,000 acre-feet of reserved Jackson Lake space was sold (1928) to the existing divisions of the Minidoka Project.

Renewed local interest developing in the North Side Pumping Division was evidenced in 1917 by the formation of an organization at Rupert, Idaho, seeking construction of the Division. This interest was reflected in the launching of detailed investigations for the Division in 1918. These investigations were continued into the year 1921.

The investigations made in the 1918-21 period included the detailed topographic mapping of 154,378 acres, and the retracing of the public land survey. In addition, preliminary canal lines were run and pumping plant sites surveyed. Land classification work during this investigation was limited to a rough reconnaissance. Subsequent to 1921, some preliminary studies were made of the pumping plants and canal system to serve the project area.

The project area and pump lift studies are described as follows in the 19th Annual Report of Reclamation Service (1919-20):

> "The North Side Pumping Unit of the Minidoka Project lies to the north and west of the present project and consists of about 150,000 acres of excellent land, of which about 115,000 acres can be irrigated with an average lift of 90 feet. Three stations between Minidoka and Minidoka Dam, pumping to a maximum of 120 feet above Lake Walcott in three steps of 40 feet each will serve 98,000 acres. One station below the west end of the present project will serve 9,000 acres with a total lift of 100 feet and 8,000 acres more with a total lift of 150 feet. * * * * "

No formal report covering the findings of these investigations and establishing the engineering and economic feasibility of the development was submitted to the Congress. The files of the Bureau, however, are replete with evidence that the feasibility of the undertaking was accepted, and its construction along the lines indicated was anticipated at the time of construction of the American Falls Reservoir.

American Falls Reservoir

The growing need for storage to meet requirements which were greatly expanded by a drought in 1919 led to the development of plans for the American Falls Reservoir as early as 1920, and the completion of its construction in 1927.

Development of the North Side Pumping Division was a primary consideration in obtaining the authorization to construct American Falls Reservoir; on court actions incident to condemnation of the reservoir right-of-way, including the relocation of the town of American Falls; and in the provision in the dam design for construction of a 30,000-kilowatt powerplant to supply pumping power. Tentative allocation of storage space in American Falls Reservoir was made for the Division, and it was included in the proposed 10-year reclamation development program released by Secretary Work in November 1926. The suggested allocation of space in American Falls Reservoir, as originally made by the Bureau of Reclamation and as furnished to the Appropriation Committee of the House of Representatives in statement of Dr. Elwood Mead, the then Commissioner of Reclamation, on November 23, 1926, was as follows:

Minidoka North Side Pumping Division	522,000 acre-feet
Irrigation Districts, etc.	790,000 acre-feet
Idaho Power Company, power rights	45,000 acre-feet
Unallotted	343,000 acre-feet

An alternative development called the Gravity Extension Division, now known as the Gooding Division of the Minidoka Project, however, found greater favor among congressional representatives of Idaho. As a result, construction of the Gravity Extension Division was initiated following congressional action in the Appropriation Act of January 12, 1927, and development of the North Side Pumping Division was postponed. Subsequently funds appropriated for that Division were transferred by the Congress in 1930 to further the construction of the Gravity Extension Division. Moreover, to meet water requirements of that Division, 400,000 of the 865,000 acre-feet of space reserved by the Federal Government in American Falls Reservoir (522,000 for the North Side Pumping Division and 343,000 unallotted) were assigned to the Gravity Extension Division. Sale of 32,000 acre-feet of storage space to Warren Act contractors prior to 1931 left a balance of 433,000 acre-feet reserved by the Federal Government. (The actual balance amounted to 433,593 acre-feet but rounded figures have usually been used in discussions.)

Basin Development Problems and Plans

Events of the years following 1930 contributed to a further delay in development of the North Side Pumping Division, and created problems which affected and required consideration within the entire Upper Snake River Basin before it was possible to establish the most desirable course with respect to the Division.

A drought which began in 1929 proved to be of unprecedented length and severity. To meet the emergency, all of the reserved

space in American Falls Reservoir was leased to the existing projects, beginning in 1931. Even with this aid, however, most of the projects suffered serious water shortages in 1931, 1934 and 1935.

The experience indicated that the then existing storage, developed on the basis of earlier water records, was inadequate to provide even a fully dependable supply for existing irrigation developments, and entirely inadequate to provide also a full supply for new land developments. From a physical standpoint, therefore, it became evident that, until additional storage could be provided for existing projects, the reserved space in American Falls Reservoir under lease could not reasonably be used for new land development. Investigations of additional storage possibilities led to the selection of the Palisades site, on the Snake River near Irwin, Idaho. The Palisades Dam Project was authorized in December 1941. The authorizing document, however, stipulated that construction of the dam and reservoir not be started until the water users to be benefited had given satisfactory assurance to the Secretary of the Interior that they would make available for storage in the reservoir at least 135,000 acre-feet of water being wasted by winter operation of canal systems for domestic and stock watering purposes.

Following the conditional authorization of the Palisades Project in 1941, the Bureau of Reclamation initiated an intensive investigation to determine (1) the areas where it was most practical to eliminate winter diversions, (2) the amount of water that could be saved thereby, and (3) the most desirable way to utilize the Palisades storage and the reserved American Falls storage to meet the overall irrigation needs of the valley. In connection with the latter, two plans for utilizing the 433,000 acre-feet of unsold American Falls space were studied in detail--one using it in conjunction with Palisades Reservoir to provide a supplemental supply for existing projects, and another using it for the development of new land in the North Side Pumping Division and on Michaud Flats. The latter area, which lies between Pocatello and American Falls, was included in the study because return flow from it can be re-used on projects above Milner Dam. On the other hand, return flow from water applied to lands of the Division would reach the Snake at points where it would not thus benefit existing developments.

The results of the water supply investigations, together with the Bureau's recommendations, are contained in a report entitled, "Water Supply for Palisades Reservoir Project, Idaho," published in 1946. This report formed the basis for an ensuing, lengthy negotiation between the several interests involved on the ultimate disposal of the reserved American Falls space.

The negotiations centered on the amount of that space to be used in connection with new land development versus the amount to be acquired by existing irrigation groups, now leasing the space, for purposes of supplementing their water supplies. The Bureau of Reclamation, anticipating that the needs of water users on existing projects would be satisfactorily met by the acquisition of space in the Palisades Reservoir, initially proposed that all of the reserved space in American Falls Reservoir be used for new land, with 210,000 acre-feet allotted to the Michaud Flats Project and 223,000 acre-feet to the North Side Pumping Division. The water users, however, holding in mind the losses experienced in 1934, even with full use of the reserved American Falls space, took the initial position that all of that reserved space should be sold to the interests now leasing it, in addition to space which those interests planned to acquire in the Palisades Reservoir. A tentative agreement was reached whereby 315,000 acre-feet of the reserved space would be sold to the canal companies and irrigation districts now leasing it, 71,000 acre-feet would be allotted to new land on Michaud Flats, and 47,000 acre-feet would be allotted to the North Side Pumping Division. (The actual tentative allotment was 47,593 acre-feet, but the rounded figure is used hereinafter in the report.)

The agreed-to allotment of American Falls space set definite limits on the acreage of land in the Division which could be developed with surface water because the yield of that space is the only remaining unappropriated surface supply in the Upper Snake River Valley that can be depended upon every year. This base supply can be augmented somewhat by natural flow diversions during wet cycles and by holdover storage water from Palisades Reservoir during dry cycles, but such possibilities are extremely limited by economic considerations and the risk of longer or more severe droughts occurring in the future.

Planning Report Investigations

With the limitations on the available surface water thus established, a study was made to determine the most desirable area on which to utilize this supply. The results of this study were set forth in a special reconnaissance report on the Minidoka North Side Pumping Extension in October 1947. This report tentatively established the area now considered as Unit A as the place where the 47,000 acre-feet of available space should be utilized, and recommended that investigation be made of the possibility of developing the remainder of the project from ground-water supplies. The subsequent studies and initial stages of development have demonstrated the soundness of these recommendations.

Numerous surveys and studies, additional to those previously made during the years 1917-1921, were carried out in connection with the project planning investigation. Topographic maps of approximately 10,000 acres previously covered only by reconnaissance mapping were prepared; detailed topography was taken of a pumping plant site on the north shore of the impoundment behind Milner Dam; and a preliminary location made for the canal to be served from the surface water supply. Initially, approximately 122,400 acres of land were classified in detail. In 1954 this detailed classification was extended to include about 8,400 additional acres, bringing the total to about 130,800 acres from which 77,650 irrigable acres were selected for overall project development.

Water supply studies made for the portion of the project to be provided with surface water (Unit A) were based on information developed in connection with studies for the Palisades Reservoir Project. An investigation of ground-water resources available for use in the Division was conducted and has been continued in collaboration with the Geological Survey, United States Department of the Interior. The report of the Survey is appended to the Project Planning Report. Water depths of all existing wells in the immediate vicinity of the Division were measured; control levels run to these wells; and a ground-water contour map prepared. On the basis of information provided by the map, three wells were drilled and tested at significant locations in the portion of the project to be served from ground-water sources (Unit B), and other sites were selected for subsequent drilling and testing.

The North Side Pumping Division, Minidoka Project planning report, dated April 1949, was submitted to Congress and resulted in H. R. 5506, 81st Congress, 1st Session. Hearings before the House Subcommittee and Special Subcommittee on Interior and Insular Affairs of the Senate, were held in August 1949. The bill included the reauthorization of Palisades Dam and Reservoir Project, authorization of American Falls Powerplant, and authorization of North Side Pumping Division of Minidoka Project. The bill was not enacted at that time and was again presented in 1950. A similar bill was passed and enacted into Public Law 864, 81st Congress, Chapter 1114, 2d Session, and approved September 30, 1950. The new bill provided that no allocation of cost on a nonreimbursable basis can be made by reason of fish and wildlife benefits, but extended the payout period on construction charges for the North Side Pumping Division from 40 to 50 years. It also provided that no transmission or distribution lines could be constructed unless such facilities are for interconnection of powerplants or for the delivery of power and energy for use in connection with construction, operation and maintenance of the projects therein authorized.

Advance Planning Investigations

At the close of investigations for the project planning report, the immediate need was recognized for continued progressive study and proving of the adequacy and extent of the ground-water supply. A section was organized under the Minidoka Project Office of the Bureau at Burley, Idaho, in July 1948 to carry on the investigations for the North Side Pumping Division. In October 1949, the section was moved to Rupert, Idaho, where an office, garage, and living quarters had been established. The activities of this branch office were directed toward the following objectives:

(1) Drill, equip, provide lateral systems for, and operate at least 10 irrigation wells in the preconstruction period to further establish evidence of the availability and adequacy of the ground-water supply.

(2) Drill, equip, and operate 4 observation wells for the purpose of obtaining overall drawdown of the ground water under continuous irrigation season pumping.

(3) Drill, equip, and operate a sufficient number of observation and exploratory wells in the vicinity of Lake Walcott to determine ground-water behavior in that area.

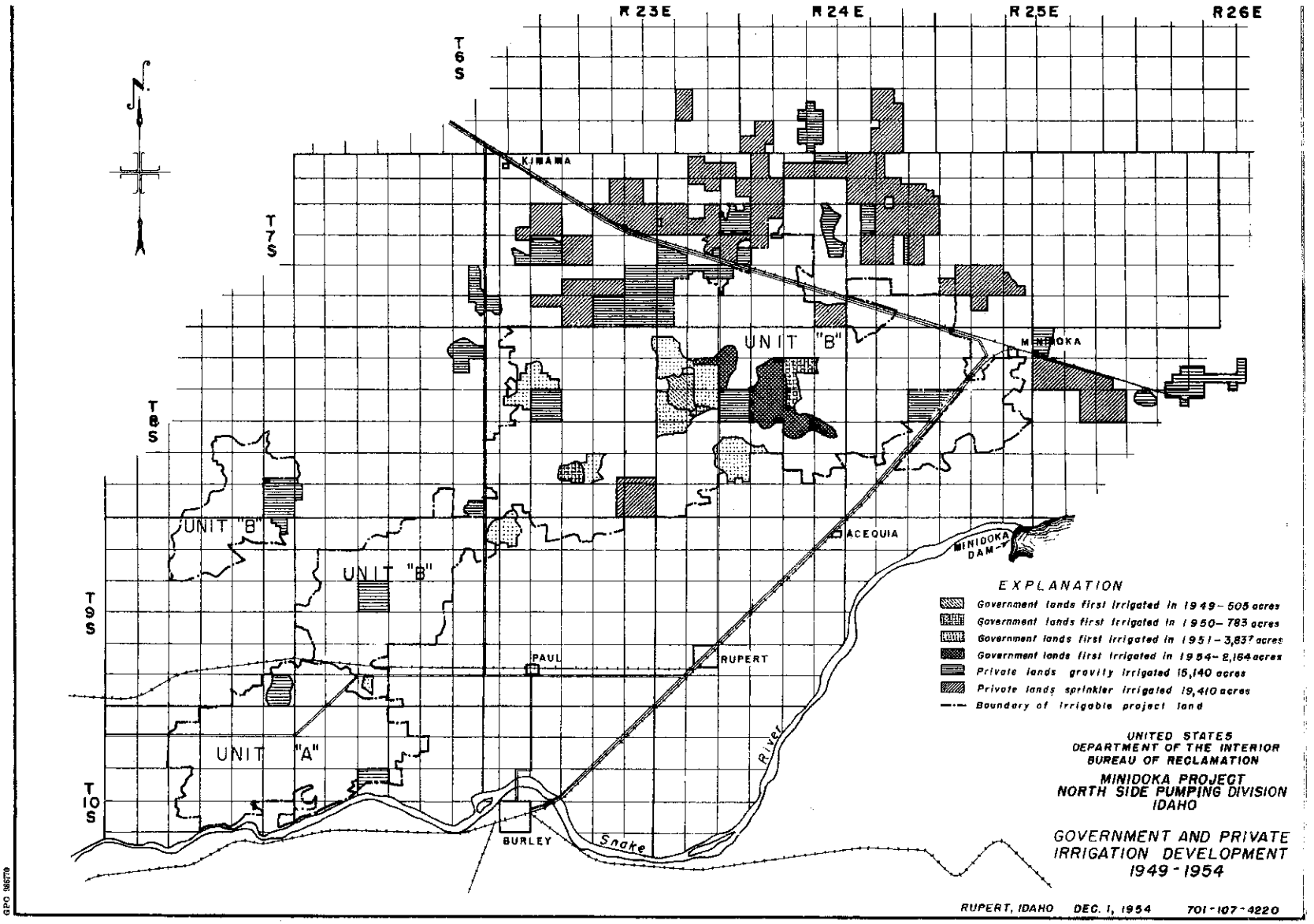
(4) Lease land under the irrigation production wells in order to make profitable use of the pumped water and supply information on ground-water depletion under continuous pumping, amount of water needed for irrigation, soil response to various crops, and information on crop yields, cropping and irrigation practices.

(5) Establish gaging stations and observe effect of pumping on the flow of ground-water springs downstream from Twin Falls, Idaho, and through Hagerman Valley.

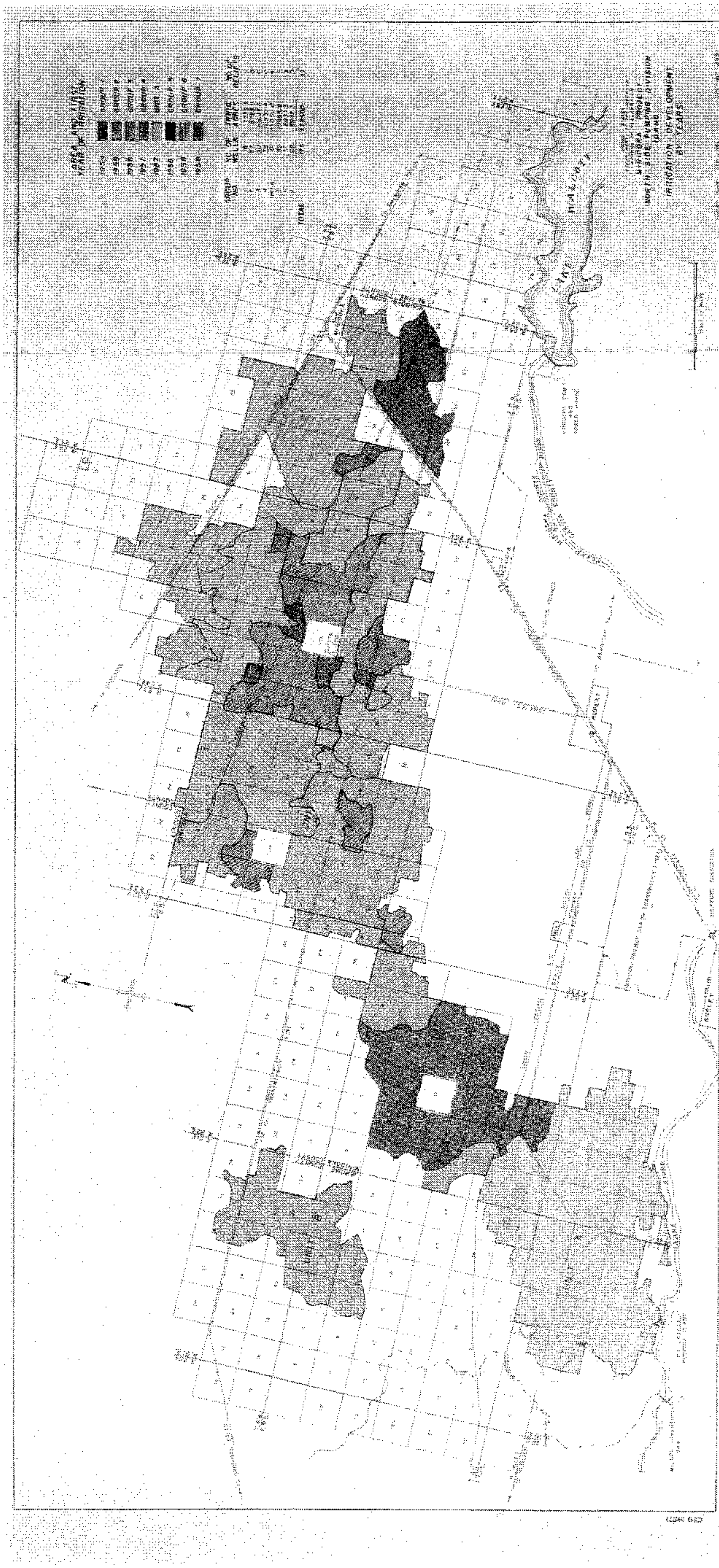
(6) Complete land classification and establish a definite project acreage.

(7) Investigate more thoroughly the drainage system of the project and revise the estimated cost thereof.

The above program was started by equipping one well with a diesel-driven pump in the spring of 1949. A lateral system was constructed to irrigate 504 acres under the well and the land was leased to six operators. Water was delivered and crops were produced in the 1949 irrigation season. Two more irrigation wells were brought under production in the 1950 irrigation season, supplying water to an additional 730 acres under lease. Seven additional production wells


R 23 E
R 24 E
R 25 E
R 26 E
T 6 S
T 7 S
T 8 S
T 9 S
T 10 S
N
KIMAMA
MINIDOKA
ACEQUIA
MINIDOKA DAM
UNIT "B"
UNIT "B"
UNIT "B"
UNIT "A"
PAUL
RUPERT
BURLEY
Snake River
EXPLANATION
Government lands first irrigated in 1949 - 505 acres
Government lands first irrigated in 1950 - 783 acres
Government lands first irrigated in 1951 - 3,837 acres
Government lands first irrigated in 1954 - 2,164 acres
Private lands gravity irrigated 15,140 acres
Private lands sprinkler irrigated 19,410 acres
Boundary of irrigable project land
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
MINIDOKA PROJECT
NORTH SIDE PUMPING DIVISION
IDAHO
GOVERNMENT AND PRIVATE
IRRIGATION DEVELOPMENT
1949 - 1954
RUPERT, IDAHO DEC. 1, 1954 701-107-4220
GPO 986670

A&B 475



A&B 476

were drilled in 1949 and 1950. These were equipped and placed in operation in May 1951 to irrigate an additional 3,800 acres. A pump was installed in a well formerly operated for the Prisoner-of-War Camp, west of Paul, Idaho. This pump began operation in the 1951 irrigation season to irrigate 70 acres, of which about 30 acres are class 5 land. The 70 acres were leased for a period of 5 years to determine the response to irrigation of the class 5 land. Leased land in 1951 totaled 5,104 acres. Since that time, 26 additional wells have been drilled and 63 more wells placed under contract. In 1954, 15 irrigation wells were in operation that supplied nearly 25,000 acre-feet of water to 7,289 acres.

Four observation wells were drilled, automatic recorders were installed, and observation of water table fluctuations was started in August 1950. An additional eight observation wells were drilled in 1951, two of which were paid for by the Minidoka and Burley Irrigation Districts, and two observation wells were drilled and placed in operation in 1953. Field operation of the recorders is performed by the Bureau of Reclamation and the data are submitted to the United States Geological Survey for inclusion in its Idaho observation well data. The latter agency has the responsibility of observing downstream spring outflow and has established the required number of gaging stations and is operating them to ascertain the effect of ground-water pumping on vested spring flow water rights.

Observations have been made on ground-water behavior, and data have been collected and compiled on water use, water requirements, crops and other appurtenant elements of the project.

Detailed land classification which initially covered about 114,400 acres has now been expanded to about 130,800 acres.

Drainage studies were completed on selected areas of the project and drainage estimated costs were revised.

Continuation of Ground-water Observations

The irrigable acreage to which Unit B should be expanded has now been determined by land classification and will depend on subsequent evaluations of the ground-water supply as the draft is increased. Observations of ground-water behavior to the date of this report and an evaluation of the ground-water resources of the area indicate that the entire 64,000 irrigable acres proposed for Unit B can be developed. A continuing program of careful observation of the ground water will be maintained, however, throughout the period of project development and operation.

Cooperation and Acknowledgments

The cooperation and assistance of numerous individuals and organizations have provided valued contributions to the advancements of the investigations. Officials of several irrigation districts and many farmers within those districts helpfully provided data requisite for the correlation studies. Others who gave freely of their time and knowledge were the county agricultural agents of Twin Falls and Minidoka Counties and Dr. G. O. Baker of the University of Idaho, who assisted in setting up the land classification standards. Public records of the Weather Bureau, United States Department of Commerce, were utilized in all matters pertaining to climate.

Special acknowledgment is due Raymond L. Nace, District Geologist, Geological Survey, for his aid in the ground-water investigations. Mr. Nace prepared the report of the Survey, which, as noted, is appended to the project planning report. Free use was made of published and unpublished information prepared by the Geological Survey. Officials of the Fish and Wildlife Service were most helpful in preparing a report on the wildlife benefits of the proposed development, which is also appended to the project planning report. The Idaho State Department of Reclamation cooperated in the ground-water filing for the project, and also made data available on water rights.

NEED FOR DEVELOPMENT

Need for additional land development in south central Idaho, which the North Side Pumping Division would help fill, is evidenced in several ways. Recently, private interests have completed a number of developments near the project area, pumping from wells tapping the underground water resources. The success of these undertakings and the demand for land have prompted plans for further expansion. There were 4,645 applications from veterans under Public Notice No. 44 for 72 farm units in 1953 and 4,910 applications under Public Notice No. 45 for 85 farm units in 1954. Each opening of a project for homestead entry by the Bureau of Reclamation in recent years has been marked by applications from qualified veterans which exceeded many times the farm units available. A continuing flood of requests indicates that the need persists.

The North Side Pumping Division, composed principally of lands held by the Federal Government, would provide, as previously indicated, approximately 695 new farms, for which veterans would have preference. The experience on physically comparable areas nearby has demonstrated that release of this large block of public domain to individual enterprise would result not only in the creation of farm opportunities, but also would give rise to related commercial and industrial opportunities and to needed expansion of the economy and tax base of southern Idaho.

CHAPTER II

PROJECT LANDS

The lands of the North Side Pumping Division lie to the north and west of the North Side Gravity Division of the Minidoka Project and occupy a position somewhat higher in elevation. The project area of 77,650 irrigable acres has been selected from approximately 130,800 acres investigated for extension of the Minidoka Project. In view of an anticipated high cost for irrigation water, the land bodies selected for project development include only those areas which will have high farming value when placed under irrigation, and which have been shown to be economically suitable through comparison with correlation areas and by budget studies. About 83 percent of these lands have excellent soils and smooth, gently undulating slopes. In crop adaptability and yields, these lands should compare favorably with the best land now under cultivation in the Upper Snake River Basin. Some 17 percent of the area selected for development is somewhat limited in productivity or adaptability. The land-use value of these lands may be enhanced by close association within individual farm units with better lands, especially when slope is the limiting factor.

PHYSICAL LAND FEATURES

Within the Snake River plain there is a wide variation in land features. Bleak areas of barren lava rock adjoin extensive, fertile, rolling areas of sagebrush and sparse grasses. Near the river courses, alluvial plains adjoin areas where the surface is mantled with wind-blown material. Under the surface mantle of the alluvial plains are areas underlain with old lake deposits, deep stream deposits, massive sheets of lava rock, or lava rock that is creviced and permeable. In contrast to this diversity outside the project, soils of the Division are in an area underlain with creviced, broken lava rock where wind-blown and air-borne mantles of very fine sandy loam and silt loam--sometimes water stratified locally--range from a few inches up to known depths of 45 feet.

The area, in general, is underlain by a series of basaltic lava flows of unknown thickness, which geologists say originated from sources generally to the north, which gave rise to a series of irregular benches, pressure ridges, depressions, and breaks. In some cases, there is a brecciated zone between the flows, and there is evidence of the lava contracting on cooling to form a pattern of cracks and crevices separating the lava into blocks of varying size. Subsequently, the area became covered with air-borne and wind-blown material. This deposit is known to range up to 45 feet in thickness and has had a smoothing effect upon the topography of the area, which,

however, later became modified by erosion. At present, approximately 15 percent of the lands appears to be in the initial stage of modification, and the drainage is very indefinite; whereas, the balance is apparently in the early youth stage and has a fairly well-defined drainage pattern.

Soils

The soils of the project area naturally fall into two main categories, those without root restrictions in the profile and those with root restrictions within a depth of five feet.

Soils with No Root Restrictions in the Profile

The major portion of the soils of the upland area have no zones or layers which restrict root penetration in the profile. They are generally characterized by a leached silt loam surface soil to an average depth of 16 inches. This layer grades into a calcareous subsoil of silt loam with slight to medium compaction which continues to a depth of 30 to 40 inches. The more or less unmodified loessal parent material below is loose and floury and sometimes contains small, soft nodules in the upper part. The roots of the sagebrush now covering the area, are generally confined to the zone above the medium compaction; however, when irrigation water is applied, experience has shown that this layer softens and roots of cultivated crops readily enter this horizon.

A small part of these soils occupy low-lying areas of relatively small extent. Here the soils are noncalcareous, colloidally stained, and range in texture from heavy silt loam to clay loam. The subsoils have pronounced blocky to columnar structure.

Soils with Root Restrictions in the Profile

Soils with restricting layers or zones in the profile are limited to a relatively small portion of the project lands. Generally, the surface soils are silt loams, but in contrast to the soils with no restriction in the profile, they have a variety of profile features which may be detrimental to normal root development under irrigation. Below, these different soils are described in relation to their distinguishing features or restrictions:

(1) Soils with subsoils of weakly cemented or very compacted calcareous silt loam which may be nodular or platy. Partial root restriction is evident where cementation is more strongly developed. Corrective measures by subsoiling do not appear practicable but the lime layers are permeable to water and soften under irrigation.

(2) Soils with a thin, limy, fractured caliche-like layer in the subsoils which, as observed, stops the downward growth of roots somewhat. Soils of this type are permeable to water and the lime layers soften under irrigation. Even though these soils usually have 24 inches of soil over the restricting layer, this condition may limit their use where subsoiling is not practicable.

(3) Soils with an indurated hardpan which may be nodular or platy or may have a series of thin, limy cappings with softer material between. These layers, as observed in the field, are only partially penetrable to roots. No corrective measures appear practicable.

(4) Soils with an indurated lime hardpan known as caliche. This hardpan layer, except where fractured, stops root penetration but is slowly permeable to water and softens under irrigation. Corrective measures, such as subsoiling, would be impracticable in most cases.

(5) Soils underlain, at depths of less than 54 inches, by creviced basalt bedrock which stops roots. Corrective measures are impracticable.

(6) Soils which are very shallow to basalt bedrock, caliche or indurated hardpan and which are unquestionably nonarable lands.

Topography

The topography of the project area is generally well suited to irrigation farming. The eastern portion of the area, except for somewhat more rolling parts along the northeast edge, is made up of large, smooth to undulating land bodies, separated by natural drainage courses. These drains always are broad and flat in their upper reaches, but generally become steeper in gradient, rougher and more deeply incised toward the lower ends where they enter enclosed basins or the river valley along the south boundary of the area. Basalt reefs and sand dunes are prominent features at the eastern extremity of the project area.

The north central part has topography very similar to that described above, except that depressions or enclosed drainage basins are an important feature, especially in T. 8 S., R. 23 E., where they are quite numerous.

The southwestern part of the project, being composed chiefly of broad expanses of land with gentle slopes, has nearly ideal

topography for farming. It consists of a compact body, and is broken by rough terrain only where it merges with nonarable lands along the east and south borders.

The extreme northwestern part is characterized by fairly large stretches of land with gentle to undulating slopes separated by long, rocky ridges and rock-bordered drainageways.

Drainage

The North Side Pumping Division of the Minidoka Project should remain comparatively free of drainage problems. Over large parts of the Division the combination of fractured, open basalt and relatively uniform aeolian soil mantle with excellent internal drainage characteristics make it very unlikely that waterlogging of soils will occur. Even where caliche developments exist extensively as along the northeast edge these occur as more or less fractured layers with loose floury material between and are therefore permeable to water. Drainage in relation to project development is treated in detail under that heading elsewhere in this report. Here the subject is discussed in relation to the classification of the project lands.

In connection with the classification work, data on drainage were collected during the field operations. This was mainly on the drainage characteristics of the upper five feet of soil. Subsequently, deep borings were made to secure information on the material between the top five feet of soil and the underlying basalt bedrock.

The Surface Five Feet

During the progress of the land classification survey, borings were made to a depth of five feet at intervals of one-fourth mile, or less, over the entire project.

Infiltration studies were made in areas where representative soil conditions and profile characteristics were known to exist. In addition, certain problem areas, such as those having high salinity and slickspots, were chosen for infiltration studies. This work was done to determine the permeability characteristics of the upper five feet of the soil profile. Laboratory analyses were made on samples taken in the problem areas. A study of these data showed that in general the project lands have excellent internal drainage characteristics and that downward movement of water is not significantly retarded in most areas where subsoil caliche layers occur.

The Deep Understrata

Twenty-four deep borings were made over the project to determine the nature of the soil material between the surface five feet and the basalt bedrock. The coverage on this study included approximately one deep boring in each township and extra borings where special problems were anticipated. This work was done by a hand-operated soil auger 4 inches in diameter. During the progress of this work, no layer above the lava rock was encountered which could not be readily penetrated by this method. Representative samples from these borings were analyzed in the laboratory to determine the permeability and other characteristics of the material. An evaluation of all the data collected shows that except for an area along the northeast edge and small occasional areas elsewhere where lime cemented layers occur in the subsoil and substratum, loose, floury, very fine sandy loams and silt loams make up the soil mantle overlying the basalt. This loose floury soil should have good internal drainage and it appears that elsewhere the caliche layers are sufficiently permeable to permit adequate internal drainage in the subsoil and substratum.

The Bedrock

The basalt bedrock which underlies the project lands and adjacent area to the north and west is generally permeable. This is evident from examination of basalt exposures adjacent to the project and from the high deep-percolation losses in the Milner-Gooding canal. This canal was, to a large extent, blasted out of basalt along the west side of the project. Exposed lava swells and ridges nearly surround the division. These outcrops are all very permeable, owing to large pressure cracks and cooling joints. Some of these cracks give evidence of extending to considerable depth and of being part of a labyrinth of fissures and caverns in the lava rock. This is manifest by a sucking and blowing phenomena of some of these cracks, caused by changes in atmospheric pressure.

The free movement of water from the soil mantle into the underlying basalt was demonstrated by a study in a pothole area near well 27C823. An acreage adjacent to this pothole had been irrigated for two seasons and the surface waste had accumulated in the closed basin during this period. Five borings, 12 to 17 feet deep to the underlying basalt, were made in rather close proximity to the pond which had formed from runoff irrigation water. One of these holes was within 20 feet of the standing water. Although the soil immediately above the basalt approached saturation, no free water appeared in any of the holes.

While it is probable that the basalt is solid in local areas, and may restrict downward movement of water, it is unlikely that these

areas are of such extent as to result in a perched water table. The depth of soil ranging to more than 40 feet, the generally moderate to high rate of lateral movement of water through the soil, and the necessity for rigid economy in water use are factors which preclude the danger of developing a high perched water table.

Experience to Date

At the present time about 35,000 acres are irrigated on or adjacent to Unit B of the Division, some of these lands having been irrigated for eight seasons. So far there have been no indications of any local development of high water tables or other serious drainage problems. Drainage problems to date are confined principally to that of collection and removal of irrigation waste water. One Division inverted drainage well has been used for four seasons and has operated satisfactorily.

Saline and Alkali Soils

Salinity and alkali are minor problems in the area selected for project development. The soils are generally deep, permeable, and have few foreseeable drainage restrictions even where the loose floury subsoil and substratum soil material is bedded with caliche layers. However, these lime-cemented layers often contain appreciable though not serious concentrations of salt. Because of the undulating to rolling topography where these higher concentrations occur, the danger of a high water table developing appears remote and salts should leach out rather than become concentrated.

The most common problem of the area involves "slick spots" that are found scattered over the project. These, however, in most instances are not thought to constitute a serious permanent problem.

The slick spots are small areas of solonetz-like soil, ranging from a few square yards to several square rods in size, that are practically impermeable to water and impenetrable to roots. Occasionally, this condition affects areas of several acres in size. These spots are always saline-alkali in character. Some visible variations exist, such as whether the salts are near the surface and the B horizon is granular, or whether the salts are below a well-developed, columnar B horizon.

Reclaimability of the slick-spot areas is based largely on the depth that the saline-alkali condition has penetrated the profile and the concentration of the spots within a given delineation. Spots that occur on the better upland soils probably will require no special attention, as land preparation and deep tillage operations evidently destroy them. Other upland soils, that have platy

structures (frequently referred to as laminations) in the subsoil, have heavier concentrations of more deeply developed slick spots that are much more likely to be permanent. Thus, in evaluating the land for agricultural purposes, both permanence and concentration of slick spots must be considered.

In addition to the general occurrence of slick spots, salinity and alkali principally of the subsoil and substratum, are common to several thousand acres of land. About 900 acres of the land initially classified consist of saline areas with no visible surface indication of salt but some may contain numerous slick spots. For the most part, these 900 acres of saline and saline-alkali soils are scattered widely over the Division in tracts which generally do not exceed 100 acres. In other instances, combinations of salinity and occasional high pH are found in the subsoil and substratum. This is a soil condition that occurs extensively along the northeast edge of the Division in combination with high concentrations of lime in the subsoil and substratum.

There are 434 acres in one body five miles west of Paul, Idaho, astride State Highway 25. This area can be characterized as having a very slowly permeable, moderately heavy, thick, platy lower subsoil that is high in exchangeable sodium and generally has a salt content above 0.2 percent. The understrata are typical of the rest of the project area. The upper subsoil is fairly permeable and usually saline-alkali. Due to the good surface soils of this area, the land is now productive, but future deterioration, as affected by subsoil conditions, is a possibility. Test plots have been established in the area to observe changes in the salt and alkali contents in various horizons, so that its suitability for permanent agricultural use can be established. This investigation will be completed this year. Indications are that these lands are reclaiming satisfactorily under irrigation.

Most of the project area is underlaid by a thick substratum of floury silt loam that is almost without exception high in exchangeable sodium and generally moderately saline. Inasmuch as this substratum is well below the root zone, and there are no known drainage restrictions, this condition is not likely to affect the quality of the land or the repayment ability of the settler. Numerous tests have shown that the exchangeable sodium in these understrata is quickly removed by leaching, alone. In correlation areas where similar lands have been under irrigation for about 45 years, no evidence of alkali damage from the understratum has developed.

LAND CLASSIFICATION

The selection of the project area was the result of an integrated analysis of lands based on both physical and economic factors, as evaluated in terms of comparable developed lands, and of requirements for this specific project. An arability classification was accomplished by a field study of the physical conditions, correlated with factors of economic productive capacity. A further determination of irrigability then was made by correlating additional economic considerations.

On the western extremity of the North Side Pumping Division and adjacent to the Milner-Gooding canal is an area which is physically separated from the rest of the project. A detailed land classification, based upon the same standards and specifications as was used previously for the balance of the project lands, was completed on this area in the summer of 1950. An additional area of about 8,400 acres along the northeast edge of the Division in the vicinity of Minidoka was classified in detail in 1954. This was the last of the remaining Reclamation withdrawn lands to be included in the plans for project development.

Correlation Areas

As an aid in setting up the land classification standards, and to coordinate the land classification and economic investigations, areas in neighboring agricultural communities having similar lands, climate, and anticipated types of farming were studied. The correlation areas chosen were (1) an area immediately east of Twin Falls, Idaho, (2) the area east of Hazelton, Idaho, and (3) the area in the vicinity of Buhl, Idaho. The land of the Twin Falls area is directly comparable with the high-quality (class 1) lands of the North Side Pumping Division. The soils of the two areas are very similar. This is substantiated by their both being identified as deep Portneuf silt loams by the United States Department of Agriculture Soil Surveys. The lands of the Hazelton area are comparable to the medium-quality lands (class 2 and 3), while the lands of the Buhl area are comparable to the lower-quality lands (class 3 and 4P). The soils in the Hazelton area consist almost totally of Minidoka silt loam such as occur extensively in the northeast part of the Division. A further discussion of the correlation areas is presented in the Agricultural Economy Chapter of this report.

Classification Specifications

Minimum specifications for soil, topography, and drainage factors were established on the basis of a correlation of these physical

conditions with similar conditions in adjacent irrigated areas. The specifications adopted for the survey (table 2) follow closely the general overall specifications set up from past experience of the Bureau of Reclamation.

In the field land classification made with these specifications, the areas regarded as arable were separated from those considered nonarable, and, in turn, the arable lands were separated into classes.

As classified according to the minimum specifications, class 1 land was at least required to meet all these requirements, and usually was of better quality than indicated by table 2. Class 2 lands were deficient in only one or two of the requirements specified for class 1, and these deficiencies met the requirements of class 2 lands as indicated in the specifications. If, however, the lands were near the minimum for more than one of these requirements indicated for class 2, the land was placed in the next lower class. A similar procedure was followed in the placing of lands in classes 3 and 4P.

Description of Land Classes

Classification of the lands under the specifications established land classes with characteristics as follows:

Class 1

Soils of class 1 lands are deep, permeable, and medium-textured, without restrictions to root growth. Surface layers are generally more than 14 inches deep over a slightly compact calcareous zone. All soils are 54 inches deep, or more, over the creviced basalt; most are 20 feet, or more, in depth over the rock. They occupy gently-sloping smooth uplands or, to a minor extent, the broader drainageways or delta-like bottoms of the area. The lands may range up to three percent in general gradient, but the slopes commonly are one-half to two percent. Most of the class 1 lands lie in large bodies. A large number of farms will consist almost entirely of class 1, inasmuch as whole sections and, in places, several contiguous sections, of land are composed mainly of this class. The lands are free from harmful accumulations of salts and have no drainage problems.

As indicated, the class 1 lands are of exceedingly high quality, are well adapted to all crops grown in the area, and are capable of sustained yields under common agricultural practices. They can be prepared for irrigation at relatively low cost.

Class 1 lands total 48 percent of the irrigable acreage of the Division.

Table 2.--Minimum land classification specification

Minidoka Project, North Side Pumping Division

Land Characteristics	Class 1 "Arable"	Class 2 "Arable"	Class 3 "Arable"	Class 4P "Limited Arable"
SOILS				
Texture	Sandy Loam to Friable Clay Loam	Loamy Sand to Very Permeable Clay	Loamy Sand to Permeable Clay	Loamy Sand to Permeable Clay
Depth: To sand, gravel of cobble.	36" plus good free working soil of fine sandy loam or heavier; or 42" of sandy loam.	24" plus--good free working soil of fine sandy loam or heavier or 30"-35" of sandy loam to loamy sand.	18" plus--good free working soil of fine sandy loam or heavier or 24"-30" of lighter textured soils.	
To crevices or basalt or indurated nodular or silty platy, cemented hardpan. (Impenetrable to roots, but slightly permeable to water).	54" plus	42" plus	30" plus	24" plus
To impervious indurated caliche hardpan.	60" plus	48" plus	36" plus	24" plus
To highly calcareous very compact (semi-permeable hardpan).	60" plus	36" plus	24" plus	12" plus
To penetrable lime zone	14" plus with 54" penetrable			
Alkalinity	pH not to exceed 8.6.	pH not to exceed 9.0.	pH not to exceed 9.0 unless soil is calcareous; total salts are low.	pH not to exceed 9.0.
Salinity 1/	Total salts not to exceed 0.2%.	Total salts not to exceed 0.3%.	Total salts not to exceed 0.5%. May be higher in open permeable soils and under good drainage condition.	If salt content exceeds 0.5%, must be under conditions where it can be controlled.
TOPOGRAPHY				
Slopes	Smooth slopes up to 3% in general gradient in reasonably large bodies sloping in the same general plane.	Smooth slopes up to 7% in general gradient in reasonably large bodies sloping in the same plane; or rougher slopes which are less than 3% in general gradient.	Smooth slopes up to 12% in general gradient in reasonably large sized bodies sloping in the same plane; or rougher slopes which are less than 7% in general gradient.	Smooth slopes up to 19% in general gradient in reasonably large sized bodies; or rougher slopes which are less than 12% in general gradient.
Surface	Even enough to require only small amount of leveling and no heavy grading.	Moderate grading required, but in amounts found feasible at reasonable cost in comparable areas.	Heavy and expensive leveling required in spots, but in amounts found feasible in comparable irrigated areas.	Surface condition such that crop adaptability is very limited and management problems would be very complex.
Cover (loose rocks and vegetation)	None	Insufficient to modify productivity or cultural practices; or clearing costs small.	Sufficient to reduce productivity and interfere with cultural practices. Clearing required but at moderate costs.	Present in sufficient amounts to cause specific limited crop adaptability.
DRAINAGE				
Soil and topography	Soil and topographic conditions such that no specific farm drainage requirement is anticipated.	Soil and topographic conditions such that some farm drainage may be required and if required, reclamation by artificial means is feasible at reasonable cost.	Soil and topographic conditions such that significant farm drainage may probably be required and if required, reclamation by artificial means may be expensive but feasible.	Soil and topographic conditions such that significant farm drainage may probably be required, and if required by artificial means, surface drainage is at least feasible.

CLASS 5--NONARABLE

Include lands which will require additional economic and engineering studies to determine their irrigability and lands reclassified as temporarily nonproductive pending construction of corrective works and reclamation through application of these works.

CLASS 6--NONARABLE

Includes lands which do not meet the minimum requirements of the next higher class, and small areas of arable land lying within larger bodies of nonarable land.

1/ Average for Root Zone and must be under soil, water and drainage conditions such that concentration will not become greater.

Class 2

Most of the class 2 lands occur in large bodies. They are generally smooth and gently rolling, and in outward appearance resemble class 1 lands. However, in places, the surface soils are shallower (10 to 12 inches of topsoil over the compact lime horizon) and in other places the lands contain slick spots. In small areas, the soils contain sufficient salines to temporarily decrease yielding capacities and require heavier water applications to ameliorate this condition.

A small portion of the class 2 lands are steeper than three percent but under seven percent slope, or are sufficiently uneven to interfere with efficient irrigation. This decreases the value of class 2 lands for irrigation below that of the class 1 lands because application costs will be greater. In the areas of uneven surface, the cost of leveling also reduces land values. The soils of these lands not only include the deep soils with no restrictions in the profile, but also a small percentage of the medium-deep soils which have some restrictions limiting root penetration or slowing down of water percolation. Surface drainage of class 2 land is good.

Crop adaptation of class 2 lands after reclamation is as wide as that of class 1 lands, but the general level of fertility and cost of reclamation are the basic reasons for placing them in a lower class. Class 2 lands, however, are of high quality, as is shown by similar lands having unquestionably a high agricultural value, on nearby projects.

The class 2 lands comprise about 35 percent of the total irrigable land of the Division.

Class 3

The class 3 lands are found in large bodies in some sections, and in relatively small bodies in other sections. Soils are mostly shallow over compacted or weakly cemented subsoils, have hardpans, or are underlain with creviced bedrock at 24 to 54 inches depth. In places, however, the soils are deep but contain salts or penetrable calcium concentrations near the surface.

A considerable portion of the class 3 land has slopes of eight or nine percent, or has lesser slope but uneven surface. These features reduce the desirability of the lands for row crops and reduce yields because of cultural difficulties. A few large land bodies have good topography, but shallow soils or fairly numerous slick spots. Extensive areas with favorable undulating to somewhat rolling topography but with high lime subsoil concentrations and considerable salt in places occur in the northeast part of the Division. However, only occasional slick spots occur in this area.